

RULE 4902 RESIDENTIAL WATER HEATERS (Adopted June 17, 1993; Amended March 19, 2009)

1.0 Purpose

The purpose of this rule is to limit oxides of nitrogen emissions from residential water heaters.

2.0 Applicability

This rule applies to manufacturers, distributors, retailers, and installers of PUC quality natural gas-fired residential water heaters with heat input rates less than or equal to 75,000 Btu/hr.

3.0 Definitions

3.1 Air Pollution Control Officer (APCO): As defined in Rule 1020 (Definitions).

3.2 California Public Utility Commission (PUC) Quality Natural Gas: Any gaseous fuel, gas-containing fuel where the sulfur content is no more than one-fourth (0.25) grain of hydrogen sulfide per one hundred (100) standard cubic feet and no more than five (5) grains of total sulfur per one hundred (100) standard cubic feet. PUC quality natural gas also means high methane gas of at least 80% methane by volume.

3.3 Heat Output: The product obtained by multiplying the recovery efficiency, as defined by Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E, by the input rating of the water heater.

3.4 Input Rating: The amount of energy a water heater consumes in one hour (Btu/Hour).

3.5 Instantaneous Water Heater: A water heater that heats water only when it flows through a heat exchanger.

3.6 Mobile Home Water Heater: A closed vessel manufactured exclusively for mobile home use in which water is heated by combustion of gaseous fuel and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F (99°C).

3.7 Pool Heater: A water heater designed to heat a pool, hot tub, or spa.

3.8 Water Heater: A closed vessel, in which water is heated by the combustion of

PUC quality natural gas and is withdrawn for use external to the vessel at pressures not exceeding 160 psig, including the apparatus by which heat is generated and all controls and devices necessary to prevent water temperatures from exceeding 210°F (99°C).

#### 4.0 Exemptions

- 4.1 PUC quality natural gas-fired water heaters with rated heat input of greater than 75,000 Btu per hour.
- 4.2 Water heaters using fuels other than PUC quality natural gas.
- 4.3 Pool heaters. On and after January 1, 2010, pool heaters shall comply with all applicable requirements of this rule.
- 4.4 Water heaters used exclusively in recreational vehicles.

#### 5.0 Requirements

- 5.1 On and before December 31, 2009, no person shall sell, install or offer for sale within the District any PUC quality natural gas-fired water heater manufactured after December 17, 1993, except for mobile home water heaters subject to Section 5.2, unless the water heater is certified pursuant to Section 6.1 to a NO<sub>x</sub> emission level of less than or equal to 40 nanograms of nitrogen oxides (calculated as NO<sub>2</sub>) per Joule of heat output.
- 5.2 No person shall manufacture for sale, distribute, sell, offer for sale, or install within the District any PUC quality natural gas-fired mobile home water heater unless the water heater is certified pursuant to Section 6.1 to a NO<sub>x</sub> emission level of less than or equal to 40 nanograms of NO<sub>x</sub> (calculated as NO<sub>2</sub>) per joule of heat output.
- 5.3 On and after January 1, 2010, no person shall manufacture for sale, distribute, sell, offer for sale, or install within the District any PUC quality natural gas-fired pool heater unless the water heater is certified pursuant to Section 6.1 to a NO<sub>x</sub> emission level of less than or equal to 40 nanograms of NO<sub>x</sub> (calculated as NO<sub>2</sub>) per joule of heat output.
- 5.4 On and after January 1, 2010, no person shall manufacture for sale, distribute, sell, offer for sale, or install within the District any PUC quality natural gas-fired water heater, excluding mobile home water heaters, instantaneous water heaters, and pool heaters, unless the water heater is certified pursuant to Section 6.1 to a NO<sub>x</sub> emission level of less than or equal to 10 nanograms of NO<sub>x</sub> (calculated as NO<sub>2</sub>) per joule of heat output.

5.5 On and after January 1, 2012, no person shall manufacture for sale, distribute, sell, offer for sale, or install within the District any PUC quality natural gas-fired instantaneous water heater unless the water heater is certified pursuant to Section 6.1 to a NO<sub>x</sub> emission level of less than or equal to 14 nanograms of NO<sub>x</sub> (calculated as NO<sub>2</sub>) per joule of heat output.

## 6.0 Administrative Requirements

### 6.1 Certification

6.1.1 Each water heater undergoing testing shall be operated in accordance with Section 2.4 of American National Standards ANSI Z21.10.1-1990, Z21.10.3-2004, or Z21.56-2006, as applicable, at normal test pressure, input rates, and with a five-foot exhaust stack installed during the nitrogen oxides emission tests.

6.1.2 The manufacturer shall demonstrate that each water heater model subject to the requirements of Section 5.0 has been tested in accordance with EPA Reference Test Method 7E, 40 CFR Part 60, Appendix A.

6.1.3 The following formula shall be used to calculate the emissions of NO<sub>x</sub> in nanograms of NO<sub>x</sub> per Joule of heat output:

$$N = (4.566 \times 10^4 \times P \times U) / (H \times C \times E)$$

Where:

N	=	NO <sub>x</sub> emission rate in nanograms of NO <sub>x</sub> emitted per Joule of heat output
4.566 x 10 <sup>4</sup>	=	unit conversion factor (ppm to nanograms and Btu to Joules)
P	=	Concentration of NO <sub>x</sub> in the flue gas in parts per million (volume)
U	=	Dry volume percent of CO <sub>2</sub> in flue gas necessary for stoichiometric combustion
H	=	Gross heating value of the gas, Btu/Cu ft (at 60°F and 30" Hg)
C	=	Dry volume percent of CO <sub>2</sub> in flue gas
E	=	Recovery efficiency, percentage, as defined in Section 6.1.3 of the Code of Federal Regulation, Title 10, Part 430, Subpart B, Appendix E

6.1.4 The manufacturer may submit to the APCO an approved South Coast Air Quality Management District Rule 1121 (Control of Nitrogen Oxides From Residential Type, Natural Gas-Fired Water Heaters), Ventura

County Air Pollution Control District Rule 74.11 (Natural Gas-Fired Residential Water Heaters – Control of NO<sub>x</sub>), or Bay Area Air Quality Management District Regulation 9 Rule 6 (Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters) certification in lieu of conducting duplicative certification tests pursuant to Section 6.1.

6.1.5 Upon request of the APCO, each manufacturer shall submit to the APCO a statement certifying the water heaters subject to this rule are in compliance with the provisions of Section 5.0. The statement shall be signed, dated and shall attest to the accuracy of all information. The statement shall include:

6.1.5.1 Name and address of manufacturer,

6.1.5.2 Brand name,

6.1.5.3 Model number, as it appears on the water heater rating plate,  
and

6.1.5.4 Heat input rating, Btu/hr.

6.2 For units subject to Section 5.0, the manufacturer shall display the following on the shipping carton and rating plate of each unit:

6.2.1 the model number,

6.2.2 the date of manufacture, and

6.2.3 the certification status.